Space Weather Forecast

Issued on Tuesday, 27 December 2022 at 13:20 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

---

Space Weather Forecast Headline: Risk of Minor geomagnetic storms throughout, mainly on 27 and 29 December. Chance of M-class flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity has been Moderate over the last 24hrs, with two moderate flares, both likely from the developing sunspot in the eastern disk, as well as continued common class flares mainly from the large region in the western disk. There are six sunspot groups on the disc. The previous most dominant regions in the western disk both continue to simplify slightly, but are still relatively large and complex. The developing sunspot in the eastern disk has shown the most distinctive evolution, becoming larger and more complex. All other spots remain generally small and simple. No Earth directed CMEs (coronal mass ejections) detected in available imagery.

Solar Wind / Geomagnetic Activity: Solar wind speeds have followed a generally steady trend at elevated levels. Total magnetic field strength generally weak to moderate following drop from a peak at the start of the period. The important north-south component, Bz, has been similarly weak to moderate following a minimum at the start of the period. since 26/2200UTC it has been persistently negative. Geomagnetic activity reached G1/Minor storm levels between 26/1200-1500UTC, before declining to Quiet to Active levels. Analysis of data suggests that the Earth was subject to a weak CME (coronal mass ejection) passage during the the start of the period.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is forecast to be at predominantly Low levels, but with a chance of occasional moderate activity from current sunspots, and those rotating onto the eastern limb.

Solar Wind / Geomagnetic Activity: Two CMEs (coronal mass ejections) currently forecast to potentially affect the Earth over the next four days. The first, from an eruption early on the 24 December, may arrive some time during day 1 (27 December), with one from the 25 December potentially arriving on day 3 (29 December), though confidence for both features is relatively low. A further high speed stream from coronal hole 59 is forecast to connect to Earth on day 3 (29 December), with effects persisting into day 4 (30 December).Geomagnetic activity is forecast to be mainly Unsettled to Active on day 1 (27 December), with a risk of G1/Minor Storm intervals. Generally Unsettled on day 2 (28 December), but with a risk of elevated geomagnetic activity due to continuing CME effects or a possible early connection to coronal hole 59, with this considered more likely on day 3 (29 December), where there is a chance of Active to G1/Minor Storms. The forecast is currently uncertain for 30 December with continuing coronal hole effects likely.

Energetic Particles / Solar Radiation: There is a daily slight chance of reaching S1 levels, largely as a result of the largest sunspot's westward progression.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2022. All Rights Reserved.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	60	30	40	30
Strong	G3	No	5	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	40	40	40	40
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2022. All Rights Reserved.